THICKNESS OF LUNAR FARSIDE BASIN EJECTA. M. C. Duplechin and R. A. De Hon, Department of Geosciences, Northeast Louisiana University, Monroe, LA 71209.

Basin formation excavates material from a growing impact cavity and redistributes the impact ejecta as a surface blanket surrounding the basin. By late Nectarian time the lunar surface was saturated by basin-sized structures and the surface was completely blanketed by an imbricate pattern of basin and crater ejecta (1,2,3). The resulting surface blanket forms an irregular layer of variable thickness composed of highly fragmented material. Thus the lunar farside and earth-facing pre-mare surface are underlain by a debris layer, the lunar megaregolith (4), which is composed chiefly of basin derived materials.

We have constructed a preliminary model of the thickness distribution of basin ejecta for the lunar farside. The thickness estimates are based on the location of currently recognized basins (5,6,7), and they assume that basin ejecta is emplaced in a manner similar to that of craters 15 to 50 km in diameter (8,9,10). For this model, it is assumed that the outer ring of most basins corresponds to the limit of excavation. A radial thickness distribution was calculated (10) and was used to construct an isopach map of the ejecta from each basin. The total thickness of ejecta at any one locality was obtained by adding the ejecta thicknesses contributed by nearby basins. The resulting thickness estimates were sampled at 5° intervals and were contoured to produce an isopach map of the megaregolith.

Assuming the 18 basins used in the calculations constitute the total population, the results (Fig. 1) depict a megaregolith with an average thickness of approximately 1400 m. As in all crater rim deposits, basin ejecta reaches a maximum thickness at the rim crest and thins with increasing range. Discontinuity of basin rims in Figure 1 is an artifact of the sampling interval and not an inherent characteristic of the distribution. Maximum thicknesses are associated with regions of contiguous basin rims. Interestingly, the maximum thickness estimate (5900 m at 5°N, 100°E) is projected for the region of overlap of the Smythii basin and two older basins. This region also exhibits the greatest local relief measured by the Apollo Laser Altimeter (11). Minimum thicknesses are found in the southwestern and northeastern quadrants of the map area in regions where no large basins are presently recognized. Estimates of thickness of accumulated ejecta on the earth-facing side range from 1.5 - 2.5 km (8) to 2.5 - 3.0 km (12).

The accuracy of the megaregolith isopach map depends on an adequate understanding of the mechanics of basin ejecta emplacement as well as the identification of all farside basins. The present model provides a gross overview of known basin ejecta distribution. Improvements in the isopach map are possible by more rigorous identification of basins and by applying more direct estimates of thickness based on crater morphologies (12,13,14). Thickness estimates of the mega-regolith provide yet another constraint to interpretation of lunar geophysical and geochemical data sets.

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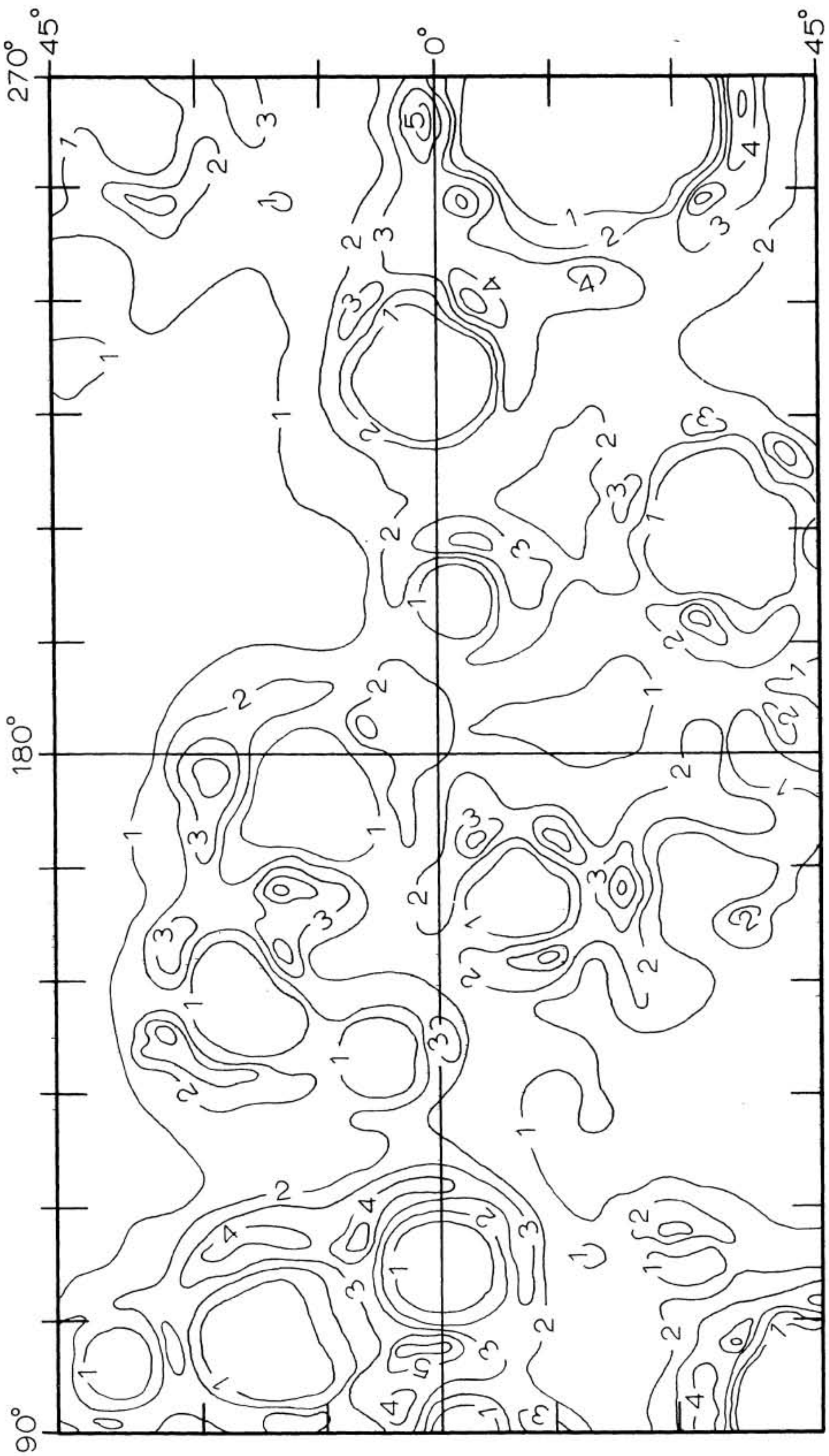

Figure 1. Model distribution of basin ejecta on the farside of the moon. Isopach interval is 1 km. For identification of basins see ref. 2.